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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/766,986	12/24/2003	Akihiro Mochizuki	350292001900	3442

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Barry E. Bretschneider
Morrison & Foerster LLP
Suite 300
1650 Tysons Boulevard
McLean, VA 22102

EXAMINER

SCHECHTER, ANDREW M

ART UNIT	PAPER NUMBER
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2883

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12/01/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/766,986	Applicant(s) MOCHIZUKI ET AL.	
	Examiner ANDREW SCHECHTER	Art Unit 2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 November 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-29,31 and 32 is/are pending in the application.
- 4a) Of the above claim(s) 8-29 and 31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-7 and 32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/30/09, 10/22/09</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Request for Continued Examination

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 13 November 2009 has been entered.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "Ferroelectric liquid crystal display device showing almost no spontaneous polarization perpendicular to the substrates in the absence of an externally applied voltage".

Response to Arguments

3. Applicant's arguments filed 13 November 2009 have been fully considered but they are not persuasive.

The applicant argues [pp. 4-6] that *Nishimura* fails to disclose a liquid crystal material with the claimed features. The applicant specifically points out passages in

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Nishimura which describe an external voltage being applied to its liquid crystal layer and causing the liquid crystal molecules to rotate. The applicant states that *Nishimura* is describing "a ferroelectric liquid crystal display in which its driving torque is based on coupling between the spontaneous polarization of the liquid crystal materials and an externally applied electric field." They further state that this rotation is a unique characteristic of liquid crystal materials whose driving torque is "based on spontaneous polarization", and it will therefore always create a polarization switching peak current (meaning, the peak shaped current when a triangular voltage is applied as recited).

This is not persuasive. The examiner agrees that *Nishimura's* liquid crystal layer may show a spontaneous polarization, but does not agree that it shows a "spontaneous polarization which is perpendicular to the pair of substrates" as recited. As explicitly discussed in the previous grounds of rejection (and repeated below), the initial molecular arrangement of *Nishimura's* Fig. 5 (middle column, before an external electric field is applied) appears to be identical to that of the applicant's Fig. 11A (E=0 columns, before an external electric field is applied), and in each case there is a spontaneous polarization which is not perpendicular to the pair of substrates. As discussed in the rejection, the structure and operation of *Nishimura's* Fig. 5 and the applicant's Fig. 11A appear to be exactly analogous, which provides a rationale and evidence tending to show that *Nishimura's* liquid crystal layer would show "almost no spontaneous polarization which is perpendicular to the pair of substrates under the absence of an externally applied voltage shown by substantially no peak shape current when a triangular voltage of 0.1 Hz, 5V at 24°C is applied" as recited. The examiner notes that

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the applicant's arguments make no attempt to distinguish structurally or operationally between *Nishimura's* device of Fig. 5 and the applicant's device of Fig. 11A. The previous rejections are therefore maintained.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 3, and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by *Nishimura et al.*, US 2001/0030731.

Nishimura discloses [see Fig. 5, for instance] a liquid crystal device comprising at least a pair of substrates [1a, 2a] and a ferroelectric liquid crystal material [3] disposed between the pair of substrates, wherein an initial molecular alignment in the liquid crystal material has a parallel or almost parallel direction with respect to the alignment treatment direction for the liquid crystal material [see paragraph 0041-0042, for instance].

Nishimura does not explicitly disclose (and is silent regarding) whether the liquid crystal material shows almost no spontaneous polarization which is perpendicular to the pair of the substrates under the absence of an externally applied voltage shown by substantially no peak shape current when a triangular voltage of 0.1 Hz, 5V at 24°C is applied. However, the prior art product seems to be identical except that it is silent as to

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what appears to be an inherent characteristic of the device (this claim limitation) [see MPEP 2112].

The examiner provides the following rationale and evidence tending to show inherency. The device of *Nishimura* uses a very strong anchor effect between the liquid crystal molecules and the alignment layers [1c, 2c] as discussed in paragraph 0044, for instance, to obtain an initial molecular alignment as shown in the middle of Fig. 5. This appears to be exactly analogous to the initial molecular alignment shown in the two “E=0” columns in the applicant’s Fig. 11A. Upon applying an electric field, *Nishimura* discloses that the liquid crystal molecule alignment changes to that shown either on the right of Fig. 5 [analogous to 2nd column from the right in Fig. 11A] or on the left of Fig. 5 [analogous to the 6th column from the right in Fig. 11A]. As explained in the applicant’s specification [see the discussion of Fig. 11, for instance], this E=0 arrangement does not have a spontaneous polarization which is perpendicular to the pair of substrates. It also appears that the reason for this lack of spontaneous polarization, a strong anchoring to the alignment layer, is the same in *Nishimura* and in the present invention. As discussed by the applicant [see the discussion of Figs. 12 and 13, for instance], the lack of a spontaneous polarization at E=0 results in substantially no peak shape current when a triangular voltage is applied as recited. Therefore, there is a strong rationale tending to show that the device of *Nishimura* inherently meets the claimed limitation.

Once a reference teaching a product appearing to be substantially identical is made the basis of a rejection, and the examiner presents evidence or reasoning tending

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to show inherency, the burden shifts to the applicant to show an unobvious difference [see MPEP 2112].

Claim 1 is therefore rejected as anticipated by *Nishimura*.

The liquid crystal molecular alignment treatment for the liquid crystal material is conducted by buffing [see paragraph 0041, for instance], so claim 3 is also anticipated. The device shows an extinction angle under the absence of an externally applied voltage, when the liquid crystal device is inserted between a polarizer and an analyzer which are arranged in a cross-Nicole relationship [see paragraph 0043, for instance], so claim 32 is also anticipated.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Nishimura et al.*, US 2001/0030731 as applied above, in view of *Takatori et al.*, U.S. Patent No. 6,040,889.

Nishimura may or may not explicitly disclose the liquid crystal molecular alignment material providing a low surface pre-tilt angle [though it uses the same material, polyimide, as the present invention], and wherein the low surface pre-tilt angle

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is 1.5° or less [*Nishimura* is silent on the pre-tilt, though it appears that a pre-tilt near 0° is appropriate for the device from Figs. 3-5 and the discussion thereof].

Takatori discloses a liquid crystal display device wherein the liquid crystal molecular alignment material provides a surface pre-tilt angle of 1.5 degrees or less [col. 9, lines 14-29]. It would have been obvious to one of ordinary skill in the art at the time of the invention to have a surface pretilt of 1.5 degrees or less in the device of *Nishimura* to obtain a display device that facilitates the desired orientation of liquid crystal, and moreover, provides a wide viewing angle [col. 3, lines 30-34]. Claims 4 and 5 are therefore unpatentable.

8. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Nishimura et al.*, US 2001/0030731 as applied above, in view of *Kitayama et al.*, U.S. Patent No. 5,583,682.

Nishimura differs from the claimed invention because it does not explicitly disclose that the liquid crystal material shows a bookshelf or quasi-bookshelf structure and that the helical pitch at the ferroelectric liquid crystal phase is 1.2 times or larger than the panel gap of the liquid crystal device [although with regard the latter limitation, *Nishimura* does teach that the helical pitch should be “sufficiently long”, see paragraph 0050].

Kitayama discloses an LC device wherein the LC material shows a bookshelf or quasi-bookshelf layer structure and where the helical pitch at the ferroelectric LC phase is 1.2 times or larger than the panel gap [col. 4, lines 23-26]. It would have been obvious to one of ordinary skill in the art at the time of the invention to have a bookshelf

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or quasi-bookshelf structure and to set the helical pitch at the ferroelectric LC phase at 1.2 times or larger than the panel gap since one would be motivated to keep the LC at low temperature [col. 3, line 25] by compensating distortion or deformation due to shrinkage during structural changes [col. 4, lines 1-7] in order to minimize deterioration in display characteristics and problems with low temperature storage [col. 3, lines 25, 48-51]. Ultimately, this serves to provide an LC device with improved gradation display characteristics [col. 2, lines 8-10]. Therefore, claims 6 and 7 are unpatentable as well.

Election/Restrictions

9. Claims 8-29 and 31 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made without traverse in the reply filed on 30 June 2005.

Conclusion

10. All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued examination and the submission under 37 CFR 1.114. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (571) 272-2302. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Andrew Schechter/
Primary Examiner, Art Unit 2883
Technology Center 2800
25 November 2009